NONPROVISIONAL APPLICATION FOR LETTERS PATENT

UNITED STATES OF AMERICA

Be it known that I, Victor M. Villalobos, residing at 2955 Summitop Court, Marietta, GA 30066, a citizen of the United States of America, have invented certain new and useful improvements in an

**ELECTRIC POWER SHUTTLING AND MANAGEMENT SYSTEM, AND METHOD**

of which the following is a specification:

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# ELECTRIC POWER SHUTTLING AND MANAGEMENT SYSTEM, AND METHOD

## TECHNICAL FIELD

The present invention relates generally to an apparatus and method for coordinating energy sources with users, and controlling the supply of energy between sources and users. More particularly, the present invention relates to a method of brokering energy supplies among various supply sources by aggregating individual supply sources and aggregating users such that energy is economically advantageously obtained via brokering through a bid/ask process.

## BACKGROUND OF THE INVENTION

It should be noted that energy is the commodity utilized, wherein power is the ability to deliver energy. They are often utilized to describe the same thing, namely, energy and may be utilized interchangeably herein.

Billions of kilowatts of electric energy are transmitted daily across the United States. Increasing demands for transmission time have created a bottleneck within the energy

transmission industry. Unfortunately, current channels of transmission continue to get busier and busier, often resulting in the transmission of power approaching gridlock condition during peak usage daylight hours.

As such, the present bottleneck of power transmission has created a business impediment of major proportions for energy re-sellers located in areas where electrical energy is available, but cannot be delivered to the desired end-users, either because the grid is overburdened and stretched to the maximum during the day, or because of too much competition for the same time window.

In 2001, the National Energy Policy reported that the bottleneck of power transmission is one of the most critical energy problems facing the United States today. The fact that the national power grid is nearly gridlocked adversely affects all parties involved in the use of electrical energy in America. That is, the gridlock affects everyone in the United States, from the end user as a homeowner to the commercial building owner, as well as the entire gamut of U.S. industries

and companies that require power to regularly conduct business.

In response thereto, President George W. Bush recently issued Executive Order 13302, requiring expedited implementation of methods to improve transmission of energy as part of President Bush's total energy solution plan. The electrical power grid today is fully utilized during the day, a restriction of time and capacity that occurs primarily due to present power transmission methods, wherein energy must be transmitted exactly and simultaneously with the utilization of energy, during a specific transmitting time window. The closest solution to present power transmission problems is to reconstruct the grid. However, billions of dollars would be required to effectively reconstruct the grid to allow for more wire capacity, the implementation of which would require a great deal of time.

Although, there are various devices and methods available for generating and/or storing energy and providing the generated and/or stored energy to end-users, such method and device disadvantages that render implementation of same highly inefficient and impractical.

For instance, various devices and methods exist for facilitating the purchase of off-peak power and the storage of same for subsequent peak shaving or load levelling usage. Such devices disclose the use of various sources of energy, such as large generation companies, small household generators (wind, solar, etc.), and the storage (via battery, capacitor, flywheel, etc.) of energy supplied therefrom. Other devices and methods lack communication and/or coordination between suppliers and users in order to facilitate matching of supply with demand. Particularly lacking is the aggregation of users and/or suppliers into group sources/users of energy. Additionally, apparently absent from current methods is a system for bidding on energy to be purchased, or asking a selling price for energy to be supplied, wherein the bid and ask prices are matched, and wherein a transmission utility has remote control over switching in of sources.

Some systems apply to the transmission of power from local grids, but do not address the major problems encountered with intergrid transmission; that is, transmission between local grids over a national grid network via intermediate carriers. Moreover, such systems do not address the

transmission permits required for intergrid use. Furthermore, such systems would indiscriminately provide energy to the grid, and are, as such, substantially limited in application to the local grid.

Intergrid remote energy transmission requires coordination and permits, wherein such transmission of energy must be scheduled in advance and timed to coincide with power storage. Improper scheduling and/or time results in the grid becoming electrically unbalanced. In its simplest terms, power must be put in and taken out at exactly the same time.

Further, previous methods and devices do not provide for the trading of energy, or the management of the sale of energy and the cash generated thereby, from the point of sale to the point of delivery and collection of funds. Current methods deal primarily with storing energy, and do not address the management and/or coordination of energy transmission, nor the collection of funds.

Still other systems fail to address the problem of interstate transmission permitting and coordination, and by

default are limited to local energy transmission only. While such systems do address the purchase and sale of power, they do so through a system based on rules and a database of contract prices. Additionally, such systems do not provide for the managing of a purchase/sale based on a bid/ask process, nor do they address the collection of cash. Furthermore, such systems fail to address the purchase of energy from providers in remote locations at an advantageous rate for subsequent sale/use in higher cost locations.

While some or all of the above-referenced devices and methods may well be utilized for storage of energy for subsequent use, each fail to adequately permit the matching of supplies with demands, and further do not facilitate the optimization of energy supply costs via a brokering bid/ask arrangement.

Therefore, it is readily apparent that there is a need for an energy supply/demand management device and method for optimization of energy costs, and management and control of energy supplies among users, and thus avoiding the above-discussed disadvantages. There is a further need for such a device and method, wherein energy purchased at an advantageous

rate via a bid/ask process can be stored for subsequent use, thereby facilitating peak shaving and load levelling, and wherein energy can be fed to an electrical grid upon command by an electrical transmission utility, and/or from individual sources, such as, for exemplary purposes only, windmill generators, solar photovoltaics, previously stored energy and the like.

## BRIEF SUMMARY OF THE INVENTION

Briefly described, in a preferred embodiment, the present invention overcomes the above-mentioned disadvantages and meets the recognized need for such a device by providing a method and apparatus for obtaining energy at a reduced cost from energy supplies purchased at off-peak periods and/or from lower cost regional suppliers. The present apparatus and method further coordinate the supplies with the demands of the end-users based upon a bid/ask methodology. Once pricing is determined, control of the sources switched into the grid to supply the energy is undertaken by a transmission utility.

The present invention overcomes the disadvantages of previous systems and methods by marrying the local power grid

to a data net, wherein the present invention synchronizes timing and coordination of delivery of energy via a data net, thereby establishing a protocol for delivery of energy to correspond with utilization of energy. The protocol achieves a balanced transmission, in both time and energy, to suppliers and users simultaneously in an orchestrated and synchronized manner.

The present invention also overcomes the problems of intergrid transmission coordination and permitting, thereby expanding use beyond local energy transmission alone.

The present invention provides a method for utilizing low transmission periods (i.e., nighttime) to transport energy to strategic locations for subsequent provision of energy during peak use periods (i.e., daytime).

The present invention resolves the problem of hundreds of electrical generating and transportation utilities acting as resellers of energy across the United States, wherein the electrical generating and transporting utilities compete heavily everyday for transmission time and permits, and battle

to utilize the limited time and availability window for transmission during the daylight hours.

The present invention further addresses marketing and other business aspects of managing and storing large amounts of electrical energy at a large number of locations, such as, for exemplary purposes only, power substations, commercial buildings, plants, residences, office buildings, apartment buildings and other strategic locations in the United States for use at a later time. The invention facilitates a method of managing the transportation of energy to such strategic locations for storage well in advance of its required use. The present invention further manages differing voltages in different portions of the distribution line, wherein voltages typically range from 755,000 volts at the generating station down to 7,000 volts at power substations, down to 120 volts at the user level.

The present invention provides a solution to the problem for Independent Power Providers (IPP) by creating a nighttime opportunity for transporting energy to desired cities in the United States in an opportunity never available before. For

the IPP, the present invention represents a major breakthrough by enabling their product (i.e., energy) to be delivered to desired markets across the United States. The present invention further opens an avenue for managing the resale of stored energy for use when most needed in large metropolitan areas such as New York, New Jersey and/or California, thereby creating a more competitive market for electrical energy.

The present invention further resolves one of the primary problems facing the United States, namely making energy available in large metropolitan cities across the United States. The present invention makes current power grids twice as effective by allowing storage of billions of megawatts at strategic locations throughout the United States well in advance of the time it is needed, wherein the stored energy can be utilized upon demand via communication over a data net.

For the end-user, either business-owner or homeowner, the present invention opens opportunities for managing his/her energy costs, and provides a method and management tool via a bid/ask process for entire groups of energy users across America. The present invention further facilitates energy

purchases in bulk at much lower cost from lower cost producers in other states, or the like, wherein the energy purchased is automatically transmitted overnight and stored at the users own premises for subsequent use, or for the purpose of reselling to the local grid at a higher price. For the homeowner and/or other power user, it also represents an unique method of managing the sale or trade of homeowner generated electrical energy, produced via solar collection, wind generation or other power generation means.

For the IPP across America, the present invention opens wider avenues to shuttle their product and makes megawatts of energy available to be utilized almost instantaneously when demand for energy exceeds local power production capabilities.

The present invention overcomes the disadvantages of previous systems and methods by providing a bid/ask methodology to manage the transmission of energy between locations, as well as managing the collection of funds. Additionally, the present invention goes beyond storage alone by handling trading between users. The present invention also resolves the issues related to intergrid transmission

coordination and permitting of same. Multiple permits may be required depending on the complexity and the multi-supplier aspects of complex transactions.

According to its major aspects and broadly stated, the present invention in its preferred embodiment is an apparatus and method for aggregating energy suppliers and energy users, and for connecting energy suppliers with energy users, by switching of energy supplies to a grid based on commands from a transmission utility, wherein the suppliers and users are selected based on a bid/ask process. In such fashion, the power grid and the data net effectively become a single functioning unit.

More specifically, the present invention is a method for aggregating end-users and/or individual suppliers into groups for the purpose of developing a bid/ask system to develop a contract for energy delivery. Particular to the system is a device at the end-user/individual supplier's location that determines the energy needs/supplies and communicates to power companies, wherein the power companies then control and coordinate the delivery of energy over the local grid, both to and from the end-user/individual supplier.

Accordingly, a feature and advantage of the present invention is its ability to allow advantageous purchase of energy at off-peak rates with storage for subsequent use.

A further feature and advantage of the present invention is its ability to match suppliers and users willing to sell and/or buy at the same price point.

An additional feature and advantage of the present invention is its ability to economize and optimize the cost of energy by balancing demand with lowest cost options.

A feature and advantage of the present invention is that energy supplies from a multitude of sources can be switched and orchestrated into the grid on command from the transmission utility.

A further feature and advantage of the present invention is its ability to balance the supply of energy with the load of energy required by users.

Another feature and advantage of the present invention is the aggregation of small suppliers to provide a group energy source.

Another feature and advantage of the present invention is the aggregation of small users to provide a group energy purchase unit for bulk pricing.

A feature and advantage of the present invention is its ability to provide energy to utility generating companies for utilization at a later time.

A feature and advantage of the present invention is that it provides a method of storing and power transmission, wherein the transmission power grid lines are utilized at night to transmit energy, thereby increasing the transmission capacity of the same lines which are typically primarily used during the day only.

Another feature and advantage of the present invention is its ability for an energy user to be able to directly or indirectly to request or negotiate better rates from a local utility by using night power rates only.

An additional feature and advantage of the present invention is its ability to remedy deficiencies of energy during peak hours by feeding stored energy back into the power grid during a black-out or other energy-need emergency.

A further feature and advantage of the present invention is its ability to work with multiple types of energy sources, such as those produced by small local producers (i.e., wind, solar, and the like), and those from large generation facilities (i.e., oil, coal, nuclear, and the like).

A further feature and advantage of the present invention is that homeowner/building owner producers can sell energy to homeowner/building owner users.

An additional feature and advantage of the present invention is its ability to supply continuous, uninterrupted energy to a building when the building is isolated by electrical storms.

These and other features and advantages of the present invention will become more apparent to one skilled in the art

from the following description and claims when read in light of the accompanying drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

Having thus described the invention in general terms, the present invention will be better understood by reading the Detailed Description of the Preferred and Selected Alternate Embodiments with reference to the accompanying drawing figures, which are not necessarily drawn to scale, and in which like reference numerals denote similar structures and refer to like elements throughout, and in which:

**FIG. 1** is a diagram depicting prior art in the field of the present invention;

**FIG. 2** is a diagram of power and data communications according to a preferred embodiment of the present invention;

**FIG. 3** is a detailed diagram of interrelationships between suppliers and users according to a preferred embodiment of the present invention;

**FIG. 4** is a detailed diagram of an individual facility connection to the power supply grid according to a preferred embodiment of the present invention;

**FIG. 5** is a detailed diagram of the components of a system according to a preferred embodiment of the present invention;

**FIG. 6** is a detailed diagram of the coordinator monitor and control module, and its ancillary components, according to a preferred embodiment of the present invention;

**FIG. 7** is a diagram depicting the aggregation of users and/or suppliers according to a preferred embodiment of the present invention;

**FIG. 8** is a diagram of the bid/ask protocol for purchase and coordination of energy by a group of users from a power supplier according to a preferred embodiment of the present invention;

**FIG. 9** is a diagram of the transmission protocol for energy purchased by a group of users from a provider via a

power grid according to a preferred embodiment of the present invention;

**FIG. 10** is a diagram of the bid/ask protocol for sale and coordination of energy by a group of users to a local power supplier according to a preferred embodiment of the present invention; and

**FIG. 11** is a diagram of the transmission protocol for energy supplied by a group of users to a local power grid according to a preferred embodiment of the present invention.

## DETAILED DESCRIPTION OF THE PREFERRED AND SELECTED ALTERNATE EMBODIMENTS

In describing the preferred and selected alternate embodiments of the present invention, as illustrated in the Figures, specific terminology is employed for the sake of clarity. The invention, however, is not intended to be limited to the specific terminology so selected, and it is to be understood that each specific element includes all technical equivalents that operate in a similar manner to accomplish similar functions.

Referring now to **FIG. 1**, wherein power flow **227** is depicted, represented therein is the current state of the art, wherein local power company **20** is connected to grid **30**. Electricity carried by local power company **20** flows into grid **30** and then flows to user **40**, wherein user **40** is a residence, office building, plant facility, or the like. User **40** pays a price rate determined by local power company **20**, wherein the rate depends upon the time of day and/or the peak level of power utilized. User **40** is unable to obtain a rate that is advantageous because user **40** purchases his energy <u>at the time of use</u>. It would be advantageous if user **40** could purchase power at a time when rates are lower, or from a supplier whose rate is lower, such as, for exemplary purposes only, a supplier remote from the vicinity of user **40**. User **40** would then store energy purchased for subsequent use.

Referring now to **FIG. 2**, wherein data flow links **170**, **180**, **510** and energy flow links **160**, **500** of the present invention are depicted, data net **70** preferably provides data communication between power company **20** via links **180**, users **40** and their associated coordinator monitor and control modules (CMCMs) **90** via links **170**, and clearinghouse **80** via link **510**.

Links **170**, **180** and **510** are preferably all bi-directional data transmission connections. Power company **20** is preferably in electrical communication with power grid **30** via uni-directional feed **500**, wherein power grid **30** is preferably in electrical communication with users **40** and associated CMCMs **90** via bi-directional power supply connections **160**. Power companies **20** preferably provide energy to power grid **30**. Power grid **30** preferably supplies energy to users **40**. Users **40** preferably post bid/ask pricing on clearinghouse **80**. Power companies **20** preferably sell energy to selected user **40** based on the bid price of user **40**. Power companies **20** preferably purchase electricity based on the ask price of user **40**. When power company **20** wishes to purchase electric energy from user **40**, power company **20** preferably sends signal **S** through communications means, such as, data net **70**, wherein signal **S** preferably activates CMCM **90** located at user **40**, wherein CMCM **90** preferably coordinates and synchronizes energy to flow from user **40** to power grid **30**.

Referring now to **FIG. 3**, power grid **30** is preferably in electrical communication with high rise building **42**, first residence **44**, second residence **46**, and third residence **48** via grid supply lines **67** and user supply lines **69**, first

electrical generation station **62** and second electrical generation station **64** via supply lines **65**. Grid **30** preferably provides electrical energy from first electrical generation station **62** and second electrical generation station **64**, wherein the energy supplied to grid **30** is preferably utilized as required by users, namely, high rise building **42**, first residence **44**, second residence **46** and third residence **48**.

High rise building **42** preferably has multiple power supplementers **100**, including both storage devices **110**, such as, for exemplary purposes only, batteries, flywheels, capacitors, or the like, and generating devices **120**, such as, for exemplary purposes only, wind-powered generators, geothermal-powered generators, solar photovoltaic arrays, fueled generators, or the like.

First residence **44** is preferably a user having no capability to store energy, but who continues to utilize electrical energy provided on grid **30** at the rate applicable to the time period of usage.

Second residence **46** preferably has storage device **110** located therein. Second residence **46** preferably purchases

energy from a supplier at an advantageous rate and stores it for later utilization. Second residence **46** preferably sells excess energy back to power grid **30** at an advantageous rate determined by the time sold and/or the user purchasing.

Third residence **48** preferably has generating device **120** and storage device **110**, wherein third residence **48** preferably produces energy via generating device **120** and preferably stores energy produced in storage device **110**. Third residence **48** preferably utilizes energy from generating device **120** as needed and preferably stores excess energy in storage device **110**. During periods when more energy is required than can be produced by generating device **120**, third residence **48** preferably draws stored energy from storage device **110**. During periods when less energy is required than can be produced by generating device **120**, third residence **48** preferably sells excess energy produced from generating device **120** to power grid **30**. When excess energy is available in storage device **110**, third residence preferably sells such excess energy to power grid **30**.

Referring now to **FIG. 4**, user **40** preferably either buys energy from power grid **30**, delivered via path **331**or may sell

excess energy to power grid **30**, delivered via path **333**. If selling energy, user **40** preferably obtains energy via paths **335**, wherein such electrical energy has preferably been generated energy via any electrical power generation means, such as, for exemplary purposes only, diesel generator **130**, solar photovoltaic panel **140**, and/or wind-driven generator **150**.

Referring now to **FIG. 5**, wherein data flow **223** and power flow **227** are depicted, alternating current energy from power company **20** preferably enters residence/business facility of user **40** via automatic breaker **190** and inverter/conditioner **210** preferably controlled by coordinator monitor and control module **90**, preferably further flowing to user via power conditioner **230** and electric panel **229**. Coordinator monitor and control module **90** preferably receives instructions from data net **70** and preferably permits power to enter facility of user **40** to be consumed. Alternately, upon signal from data net **70**, coordinator monitor and control module **90** preferably routes power to automatic breaker **190** for storage of energy. Automatic breaker **190** preferably provides energy to inverter/conditioner **210**, wherein inverter/conditioner **210** then preferably supplies direct current to energy storage bank

**220**. When energy is subsequently needed by facility of user **40**, it is preferably drawn from energy storage bank **220** through power conditioner **230**, via inverter/conditioner **210**, such as, for exemplary purposes only, a sine wave inverter, to preferably provide mains current for facility of user **40**. Concurrently, auxiliary alternating current power supply **130**, such as, for exemplary purposes only, a diesel or gasoline generator, provides energy to power conditioner **240**, wherein power conditioner **240** is preferably directed by CMCM **90** via inverter/conditioner **210** to synchronize phase, voltage, modulation and frequency with power coming via breaker **190**, thereby preferably providing synchronized input to inverter/converter **210**.

Auxiliary storage **260** preferably provides direct current electricity to first power conditioner/charger **252**, wherein first power conditioner/charger **252** preferably converts the voltage of auxiliary storage **260** to a voltage suitable for charging energy storage bank **220**, or for use by users **40**, or for resale to power grid **30** as synchronized by CMCM **90**.

Renewable energy sources, such as for exemplary purposes only, solar **140** or wind energy **150** preferably provide energy

to second power conditioner/charger **254**, wherein second power conditioner/charger **254** preferably converts voltage of renewable energy sources **140**, **150** to a voltage suitable for charging energy storage bank **220**, or for use by users **40**, or for resale to power grid **30** as synchronized by CMCM **90**.

Coordinator monitor and control module **90** preferably receives a command from data net **70** sent by power company **20** and takes action commanded thereby. Coordinator monitor and control module **90** can either permit energy from existing power grid **30** to enter facility of user **40** or it can activate breaker **190** to allow energy, synchronized in phase, voltage, modulation and frequency, to flow to power grid **30** based on command from power company **20**. Energy flowing in or flowing out is monitored via electric meter **271**.

Referring now to **FIG. 6**, wherein the details of CMCM **90** are depicted along with the interconnections thereto, wherein directional controller **300**, processor **310**, data display **320**, unique meter identifier **330** and electric energy measuring means **270** collectively comprise CMCM **90**. Measuring means **270**, such as, for exemplary purposes only, a bi-directional meter, is preferably controlled by control processor **310** via path

**217**, and wherein the direction and quantity of flow of energy through measuring means **270** is preferably monitored by measuring means **270** and is preferably set by directional controller **300** via path **219.** Measuring means **270** further preferably connects to router circuit breaker **190** via path **201**, wherein router circuit breaker **190** preferably switches the flow of energy in response to commands from directional controller **300** via path **199.** Energy flowing to be utilized via router circuit breaker **190** preferably passes via path **191** through to user electric panel **350**, wherein the energy is available for utilization by the home or facility owner.

Unique meter identifier **330** preferably provides identification of measuring means **270** to control processor **310** via path **193**, wherein control processor **310** preferably communicates via path **195** with computer **290**, and wherein computer **290** preferably further communicates via path **197** with data net **70**. It will be recognized by those in the art that CMCMs **90** for users **40** could communicate directly via computer **290** to suppliers, such as for exemplary purposes only, power company **20**, or with other users **40**. Control processor **310** preferably further displays current electrical transmission data via path **203** to local display **320**. Unique meter

identifier **330** preferably verifies that power transmission data is being transmitted from or to the correct location in order to prevent false orders from being entered and false data from being utilized.

When economic and/or oversupply conditions allow the selling of energy, control processor **310** preferably signals directional controller **300** via path **205** to change router circuit breaker **190** to a condition allowing energy to be sent out. Energy previously stored in storage **110** preferably travels via path **207** and is preferably inverted and conditioned by inverter/converter **230**, and is then preferably sold out through energy measuring means **270** via path **209** to router circuit breaker **190.** Alternatively, energy from storage **110** can be routed via path **211** through to electric user panel **350** by control processor **310,** wherein energy is then sent via path **205,** directional controller **300** and path **213** to augment incoming energy arriving via router circuit breaker **190.**

Control processor **310** preferably monitors power status measurement points **340** via path **215.** Control processor **310** is also preferably programmed to provide a single transmission

transaction, or alternately could be programmed to manage a series of scheduled transactions.

Referring now to **FIG. 7**, energy from, or to, power grid **30** preferably travels via power flows **227** and is preferably supplied to, or provided by, CMCMs **90a**, **90b**, **90c**, **90d** and **90e**, wherein data flows 223 are also shown. CMCMs **90a**, **90b**, **90c**, **90d** and **90e** preferably bid for energy desired, or preferably ask a price for energy user will supply to power grid **30** via user's state or regional clearinghouse **360a**, for CMCMs **90a**, **90b** and **90c**, or state or regional clearinghouse **360b** for CMCMs **90d** and **90e**, respectively. The respective clearinghouses **360a** and **360b** preferably communicate with each other via network based clearinghouse **370**, wherein bid and ask prices are preferably matched thereby. Grid transmission agency **380** preferably coordinates transmission to individual CMCMs **90a**, **90b**, **90c**, **90d** and **90e** and preferably provides permitting therefor.

CMCMs **90a**, **90b** and **90c** preferably combine to form one aggregated user/supplier grouping. CMCMs **90d** and **90e** preferably combine to form another aggregated user/supplier grouping. A group bid or ask price, along with quantities

desired or available, is preferably provided to the CMCM's respective clearinghouses **360a** and **360b** via data net **70**, wherein the total aggregated quantity and pricing are preferably matched with available supplies or needs of other groups by network-based clearinghouse **370** and grid transmission agency **380**. CMCMs **90** preferably communicate with clearinghouses **360a** and **360b** to coordinate transmission of energy and also to preferably send/receive transmission diagnostics.

Referring now to **FIGS. 8** and **9**, wherein energy sale to user aggregates is depicted, and wherein **FIG. 8** depicts the communications flow network and **FIG. 9** depicts the power flow network for such a sale of energy, an automatic power/energy request and a bid price for energy are preferably sent by CMCM **90** via data net **70** to buyer clearinghouse **420**. Buyer clearinghouse **420** preferably aggregates power/energy requests from CMCMs **90** within a specifically-defined user grouping, and/or preferably aggregates CMCMs **90** requiring energy into a user grouping for the purpose of determining energy and power requirements. Buyer clearinghouse **420** preferably posts a bid price for aggregate user grouping, wherein seller clearinghouse **410** preferably compares the bid price with the

asking price from energy suppliers **400** and either rejects or accepts the bid. If the bid is accepted, seller clearinghouse **410** preferably schedules power delivery and arranges required permitting, as is required for intergrid transmissions. It will be recognized by those skilled in the art that seller clearinghouse **410** could post the asking prices and buyer clearinghouse **420** could compare bid pricing from user grouping of CMCMs **90** and/or local power provider **20** for matching with the asking prices.

CMCM **90** may purchase energy for subsequent use and/or sale to economize and optimize the cost by balancing demand with lowest cost options, and, in such an event, will send energy purchased to storage **110**.

Buyer clearinghouse **420** and seller clearinghouse **410** preferably continuously compare varying bid and ask prices. When a match is found, buyer clearinghouse **420** and seller clearinghouse **410** preferably accept the contract for energy supply and notify CMCMs **90**, transmission providers **400**, power generation station **60**, and local power provider **20** of scheduled time and permit for energy transmission. CMCMs **90** are preferably continuously monitored, wherein the monitoring

may be viewed visually, for readiness by buyer clearinghouse **420** until transmission is completed.

Power transmission preferably begins in accordance with the contract, schedule and permits established. In the event of interruption of delivery, buyer clearinghouse **420** preferably restarts delivery. Upon completion of delivery of energy required, funds are preferably collected by buyer clearinghouse **420** from local power provider **20** or user grouping of CMCMs **90**. Buyer clearinghouse **420** preferably transfers funds electronically to seller clearinghouse **410**, wherein seller clearinghouse **410** preferably issues funds electronically to transmission providers **400** and/or power generation station **60**.

Referring now to **FIGS. 10** and **11**, wherein **FIG. 10** depicts the data communication flow network and **FIG. 11** depicts the power flow network, showing suppliers, users, grids and the transmission lines connecting same, a request for electric power is preferably made by local power provider **20** or buyer clearinghouse **420** based on present needs or pre-scheduled requirements, wherein local power provider **20** preferably provides a bid price to buyer clearinghouse **420**.

CMCMs **90** preferably communicate availability of energy from storage **110**, or generation means, such as, for exemplary purposes only, solar photovoltaic or photothermal **140**, windmill generator **150** and/or diesel generator **130**.

Seller clearinghouse **410** preferably aggregates available individual energy supply quantities and the asking prices as determined by CMCMs **90** via data net **70**, and preferably posts the aggregated asking price and quantity available on data net **70**.

Buyer clearinghouse **420** preferably matches the bid price with the asking price, wherein a contract for delivery of energy to local power provider **20** is created. Seller clearinghouse **410** preferably schedules time of delivery and obtains permits for transmission over intergrid transmission provider **400**, if required, or alternately schedules power delivery to local grid **30a**.

Energy is delivered from storage **110**, or generation means **130**, **140**, and/or **150** to local power grid **30a**. Local power grid **30a** preferably transmits energy via transmission provider

**400**, to local grid **30b**, wherein local power grid **30b** preferably provides energy to end-users, such as, for exemplary purposes only, condominium or apartment **430**, shopping mall **440**, residence **450** and/or office building **460**.

Seller clearinghouse **410** preferably monitors CMCMs **90** for readiness, wherein the monitoring may be viewed visually, until transmission is completed and preferably further restarts transmission in the case of interruption. Upon completion of transmission of energy, buyer clearinghouse **420** preferably collects funds from local power provider **20** and issues funds electronically to seller clearinghouse **410**. Thereafter, seller clearinghouse **410** preferably electronically distributes funds to CMCMs **90**.

In an alternate embodiment of the present invention, clearinghouses **410** and **420** could log bid price and asking price data and transform the data into a report. Such a report could then be utilized for marketing purposes, and/or sold to others for marketing purposes.

It is contemplated in an alternate embodiment of the present invention that storage **110** of energy could take place at an electrical substation.

It is further contemplated in an alternate embodiment of the present invention that user and/or suppliers could be aggregated for purchasing purposes even though they are not on the same local grid, and, in fact, could be hundreds or thousands of miles apart, but aggregated by the common thread of their bid/ask price contract.

It is contemplated in another alternate embodiment that users may obtain their energy directly from suppliers and may communicate directly therebetween.

It is contemplated in still another alternate embodiment that a user could receive a supply of energy from a supplier via multiple different transmission paths.

In yet another alternate embodiment, it is envisioned that delivery of energy could be carried out on a set periodic schedule after a contract is established.

In still another alternate embodiment, it is contemplated that storage of energy could take place at any point along the distribution line from supplier to user, including, but not limited to, storage at supplier locations, storage at electrical substations and storage at user locations.

The foregoing description and drawings comprise illustrative embodiments of the present invention. Having thus described exemplary embodiments of the present invention, it should be noted by those skilled in the art that the within disclosures are exemplary only, and that various other alternatives, adaptations, and modifications may be made within the scope of the present invention. Merely listing the steps of the method in a certain order does not constitute any limitation on the order of the steps of the method. Many modifications and other embodiments of the invention will come to mind to one skilled in the art to which this invention pertains having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the invention is not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although

specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation. Accordingly, the present invention is not limited to the specific embodiments illustrated herein, but is limited only by the following claims.